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**DRAFT WORK PLAN
FOR THE INTERIM REMEDIAL ACTION
AT THE
HURLEY SOILS INVESTIGATION UNIT**

Submitted to:

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Figure 1-1 Remediation Areas in Hurley

1.0 INTRODUCTION

Chino Mines Company (Chino) is proposing to conduct an Interim Remedial Action (IRA) at the Hurley Soils Investigation Unit (HSIU) as part of the Administrative Order on Consent (AOC) with the New Mexico Environment Department (NMED). This IRA will consist of remediation of properties with soil containing greater than 10,000 mg/kg copper.

A Remedial Investigation/Feasibility Study (RI/FS) for the HSIU has been ongoing under the AOC between Chino and NMED. Remedial alternatives are being evaluated as part of the FS for the HSIU. The presumed remedy for the IRA is soil excavation with restoration using clean soil and landscape material.

This Work Plan was developed along with a Field Sampling Plan (FSP) which describes the quality assurance/quality control sampling procedures to be employed during the implementation of this work plan. The FSP is available as a separate document.

A Pilot Program was conducted in the Summer of 2005 on four properties in Hurley to test remediation methods and procedures, and sampling and analysis strategies. The observations and conclusions of the Pilot Program are incorporated into this Work Plan and the FSP, as appropriate.

All appropriate IRA documentation, including plans, reports, analytical results, and field documentation will be submitted to NMED. All work related to the IRA will be conducted in accordance with the AOC. This Work Plan provides the proposed approach for the IRA.

1.1 Background and History

1.1.1 Site Location and Description

The Chino mineral processing operations are located adjacent to the east edge of the town of Hurley. The Southwestern Railroad runs in a north-south direction along the west edge of the town, and a spur runs through the town and into the former mill and smelter site (Figure 1-1). The Santa Rita open-pit copper mine operated by Chino is about 7 miles north of Hurley.

The town of Hurley is comprised of residential town blocks laid out in a uniform manner. The southern portion of the town of Hurley (the area south of the rail spur) consists of housing laid out uniformly within town blocks with about 12 residences per block, except where schoolyards or parks occur. The northern portion of the town (north of the rail spur) was also laid as town blocks, but the houses in this area are smaller and more closely spaced than the homes in the southern portion.

1.1.2 Current Operations

Current operations include the power plant and tailing impoundments to the south of the smelter. The former Hurley mill has been dismantled and the smelter is temporarily in shut down mode. The smelter was in compliance with Federal Clean Air Act (CAA) regulations, and New Mexico Environment Department, Air Quality Control Regulations (NMED-AQCR) permits when it was shut down in 2002. In accordance with AQCR, Chino performed continuous monitoring of sulfur dioxide emissions from the stack.

1.1.3 Historical Releases in Hurley

Fugitive particulate emissions from historic mineral processing operations in the Hurley area contained high copper concentrations. The fugitive particulate were deposited on nearby soil in the town of Hurley, resulting in elevated levels of copper in Hurley soil. Historical mineral processing operations include milling, concentrating, and mixing copper concentrate.

Specific Hurley operations identified as historical sources include fugitive dust from the Hurley concentrator and ore reduction facility (located adjacent to the south east part of Hurley), solid material handling operations (located adjacent to the north east part of town) and emissions from the smelter stack;

The concentration of metals deposited on Hurley soil is directly related to the amount of particulate deposited. Therefore, elevated metal concentrations occur in areas close to the historical sources, with a gradual decrease in metal concentration in all directions with increasing distance from the source.

1.2 AOC Activities

1.2.1 Remedial Investigation/Feasibility Study

The HSIU RI/FS was initiated in 1995, and provided environmental data that were used, among other things, to characterize effects from mineral processing on residential soil in the HSIU. Several Phase II RI activities were conducted to further characterize the soil within the HSIU and to provide additional data to refine the human health risk assessment (as described below), including a garden vegetable study, a lead-based paint study, and a Bioaccessibility Study (Chino 2002) to characterize the solubility of copper in Hurley soil.

Using data from the Phase I and Phase II RIs, surface soil copper concentrations were mapped using a krigging technique to model copper concentrations throughout the town of Hurley. The data used to develop these maps were collected from a grid of approximately one sample per town block. Figure 1-1 shows that copper concentrations are highest on the east side of town (closest to the mineral processing operations), and decrease with distance away from the facility.

1.2.2 Human Health Risk Assessment

A human health risk assessment was conducted by Gradient Corporation (Gradient) for the NMED to provide estimates of potential risk to residents of the HSIU from affected soils based on RI data. A deterministic risk assessment was submitted to NMED in May 2000 (Gradient 2000). The risk assessment was conducted following the EPA guidance model for chronic exposure to metals in soil with copper as the primary risk driver for the HSIU.

The risk assessment identified human health effects from ingestion of copper in solution, based on studies of ingestion of copper sulfate in water. Studies of the solubility of copper in soil were not available at the time of the risk assessment. The health effects from copper in solution include acute gastrointestinal effects such as nausea and vomiting. These effects are typically transient and reversible, and, since they are acute effects, do not follow the chronic model typically used to assess human health risk.

Gradient revised their risk assessment to incorporate additional data collected from Phase II RI activities, to include an estimate of copper solubility in soil, to incorporate Chino comments on the

risk assessment, and to provide a model of acute rather than chronic effects from incidental copper ingestion. Gradient used Monte Carlo simulations to provide a probabilistic evaluation of potential risks in the HSIU, as reported in an addendum to the risk assessment submitted to NMED on December 19, 2003 (Gradient 2003).

1.2.3 Remedial Action Criteria

On July 27, 2005, NMED issued pre-Feasibility Study Remedial Action Criteria (RAC) for the HSIU of 5,000 mg/kg copper in soil, with the following conditions:

- Chino shall identify all residences in the town of Hurley with children under the age of 8 years of age and provide this information to the NMED; and
- Chino shall develop a public health advisory that describes the extent of copper soil contamination in Hurley, describes the potential health risks associated with ingestion of copper; and requests that anyone experiencing health concerns associated with nausea or gastrointestinal issues to contact NMED.

The pre-FS RAC will be used as an action (i.e., target remediation) level in the IRA.

1.2.4 Current Activities

The issuance of RAC initiated a 60-day clock for initiating the FS for the HSIU. The FS is being prepared concurrent with the IRA.

1.2.5 Proposed IRA

The purpose of the proposed IRA is to conduct remediation in an expedited manner at the residential properties containing the highest observed copper concentrations in soil.

Figure 1-1 presents the estimated copper concentrations in the town of Hurley divided into zones of greater than 10,000 mg/kg copper, and between 5,000 mg/kg and 10,000 mg/kg copper. Those properties within the greater than 10,000 mg/kg copper zone will be remediated as part of the IRA.

Properties with concentrations of between 5,000 mg/kg and 10,000 mg/kg copper will be remediated in a future phase of remediation and are not part of this IRA. In the transition zone, as shown in Figure 1-1, copper concentrations are likely below 5,000 mg/kg, but further sampling will be performed to delineate the limits of the 5,000 mg/kg boundary more precisely.

2.0 REMEDIAL ACTION OBJECTIVE

The Remedial Action Objective (RAO) is a site-specific remediation goal that defines the desired outcome of actions taken to reduce human health or environmental risk due to site constituents of concern. RAOs provide a general description of what the site remedy will accomplish. The RAO for Hurley residential surface soil is as follows:

- Prevent incidental ingestion of residential soil containing copper concentrations that exceed 5,000 mg/kg.

The risk assessment discussed above identified potential health effects from ingestion of copper. These effects were estimated from a conceptual model using the assumptions listed below, among others. These assumptions were, in turn, used in the development of sampling, analysis, and remediation strategies for the IRA.

- The conceptual model indicates that copper was transported to residential yards via aerial dispersion from historic mineral processing sources, and that copper concentrations are highest on the east side of town (closest to the operations), and decrease with distance away from the operations.
- RI sampling results indicate that there is low copper concentration variability on a block-sized grid, which is consistent with aerial dispersion patterns. This suggests that copper variability within an individual property will also be very low.
- The primary receptor in the risk assessment is a child that incidentally ingests soil at a rate of 200 mg/day while playing outside in their yard.
- The exposure area for the child is one residential yard.

2.1 Remedial Action Description and Rationale

The remedial action selected for the Hurley IRA is soil excavation with restoration using clean soil and landscaping materials in those residential properties where soil copper concentrations are greater than 10,000 mg/kg. Prior to beginning remediation activities, each property within the IRA project area will be tested to determine actual copper concentrations in surface soil. Soil will then be excavated from areas where copper concentrations exceed the action level, and the excavated areas will be restored with clean material. Removed soil will be transported to an approved disposal location within Chino operations.

The excavation with restoration remedial action is an effective remedy because: (1) soils with copper concentrations are above the action level are removed; sampling results from the RI and pilot program indicate that high copper concentrations are generally found only in the upper few inches of surface soil; and (2) where all soil with copper concentrations above the action level cannot be removed the pathway for exposure (direct ingestion) is eliminated by the clean restoration soil, which will act as a cover.

This remedial action is also feasible and implementable, as demonstrated in the approach described in Section 3.0.

3.0 APPROACH

Properties within the IRA Project Area will be remediated following the procedures described below. Properties will be remediated by removal of surface soil, followed by restoration of the property to conditions similar to those prior to remediation.

The FSP supplements this work plan to provide the objectives, rationale, statistical background, and procedures for pre-remediation sampling and analyses (to identify areas to be remediated), and all post-remediation sampling (to confirm that action levels have been met).

3.1 Health and Safety

All work conducted as part of the IRA will be conducted in accordance with the AOC Health and Safety Plan (SRK 1997).

3.2 Responsible Parties

There will be several responsible parties involved in the IRA Process. They are described below:

Property Representative (PR)

The property owner or their representative (PR), will have responsibilities for signing agreements to allow access, selecting restoration options, and indicating satisfaction with property conditions upon completion of remediation activities.

The property owner is responsible for making decisions regarding non-permanent personal items within a property that may affect remediation activities. If the property owner is not available for on-site decisions, they may delegate responsibility, by signing a consent form, to an alternate person who is available for making decisions regarding the property.

Chino Representative

A representative from Chino will oversee all IRA activities and will be available during remediation activities. Responsibilities include community relations tasks, strategic decision making, and other activities to support the project.

NMED Representative

A representative from NMED will be available during all remediation activities to observe and represent the Agency's position in the remediation activities. Responsibilities of NMED include oversight of field sampling (pre- and post-remediation) activities and results, handling as applicable, inquiries, complaints, comments, etc. from the public, consultation if unexpected conditions are encountered, and other activities as needed to support the regulatory aspect of the IRA.

Community Relations Specialist (CRS)

The CRS will make initial contact with the PR, and will be the primary point of contact with that person. The CRS has responsibility for keeping lines of communication open for all applicable PRs, walking each PR through the IRA process so that they are knowledgeable and comfortable with the process, and addressing any questions or concerns at any time in the IRA process. Specific responsibilities include:

- Secure a signed access agreement form from the PR to allow soil sampling and remediation access;
- Walk the entire property with the PR to determine disposition of personal property that must be moved to allow access for remediation, document pre-remediation conditions and set up a property notebook;
- Negotiate restoration options with the PR, and obtain a signed agreement;
- Obtain sign-off from PR indicating satisfaction with restored property conditions.

Construction Quality Assurance Manager (CQAM)

The CQAM will be responsible for performing all sampling and analytical duties, per the CQA Plan, and coordinating with the Construction Manager (CM) to direct excavation and restoration activities. Specific CQAM responsibilities include:

- Perform sampling and analysis for the screening of borrow soils or gravels to be used for restoration;
- Perform pre-remediation sampling and analysis of soil in each property to identify areas that require remediation.
- Coordinate with the CM to delineate the areas that require remediation and agree upon the appropriate remediation procedures; and
- After excavation, perform confirmatory sampling and analysis to determine if remaining soils are below the action level, per the statistical test methods described in the FSP. If an area of remaining soil is above the action level, delineate the areas with the CM. If remaining soil is below the action level, then notify the CM that restoration activities may commence.

Construction Manager (CM)

The CM will oversee all activities of the Remediation Contractor (RC) to verify that they are conducted to technical specifications. The CM will also coordinate excavation and restoration activities with the CQAM. The CM will perform the following activities:

- Working with the CRS, walk the entire property with the PR to document pre-remediation conditions and set up a property notebook; negotiate restoration menu options with the PR, and obtain a signed agreement;
- Observe RC's soil removal activities;
- Coordinate with CQAM regarding post-removal sampling;
- Observe RC's restoration activities;
- Verify that restoration has been satisfactorily completed; and
- Working with the CQAM, document post-removal property conditions (notes and photographs).

Remediation Contractor (RC)

The RC will provide all labor, material, and equipment and will operate all heavy machinery to perform remediation and restoration activities. The RC will be under Chino contract to operate in accordance with technical specifications, and all health and safety requirements, and direction from the CM. The RC personnel will conduct themselves in a manner that is respectful of personal property, and will work with the property owner's interests in mind. The RC will perform the following activities:

- Prepare the properties prior to soil removal including the removal and storage, disposal, or recycling of removable objects on the property, per the agreement with the PR;
- Excavate affected soils to the depth and extent as directed by the CM;
- Haul contaminated soils to the specified disposal location; and
- Restore the properties after soil removal has been completed per the agreement of the PR.

3.3 Interim Remedial Action Tasks

The tasks for the IRA project are described below. The responsible person for each task is also listed. Each property will be handled in the same manner using the same approach and procedures.

Pre-Remediation Activities

1. Prior to beginning remediation for a specific property, contact the property representative PR to schedule a meeting (Chino and CSP).
2. Meet with property representative (CSP, CQAM, and PR). Describe remediation activities and review the schedule PR's responsibilities, review the Access Agreement (AA) and obtain signature from PR.
3. Conduct soil sampling and analysis in each individual yard per the FSP (CQAM). The CQAM will first visually survey the yard to determine whether it should be sub-divided. A yard may be sub-divided if there are two distinct vegetative conditions present, such as a well maintained grass front yard, and a bare soil back yard. Soil in the yard(s) will then be sampled and analyzed using XRF to define copper concentrations. Samples will be taken on a systematic grid designed to identify a hotspot with a minimum area representing about 5% of the area (500 square feet per yard).
4. Conduct Discrete Area sampling and analysis per the FSP (CQAM). Discrete areas such as gardens, raised beds, or areas with imported materials may contain copper concentrations below the action level or effectively provide permanent cover of soil with elevated copper concentrations. Samples will be collected at a frequency of about 1 sample per 1,000 square feet of an area. Samples will be analyzed using XRF, and the results will be used to determine whether remediation is needed in these discrete areas.
5. Survey the property to identify areas that are effectively paved or covered with concrete, structures, or other impervious materials and mark such areas on the property map (CQAM and NMED).

6. Conduct utility locate activities for the property (RC). A one-call utility locate service will be contacted at least 2 days prior to excavation, and the underground utilities will be marked.
7. Conduct pre-remediation reconnaissance of the property (CSP, CM, and PR). Once the results of the pre-remediation characterizations are available, a reconnaissance of the property will be conducted to map out the areas to be remediated. Any personal items requiring removal or relocation will be identified, and noted in the Work Agreement (WA) for the property. Underground utilities or other non-visual obstacles will be identified by the PR, if possible. A property notebook will be developed that will contain sketches of the property with all pertinent features identified. A digital photographic record of pre-remediation conditions will be collected. Sign WA detailing property disposition and restoration options. Establish a schedule for the remediation.

Remediation Activities

8. Remove personal property from the areas to be remediated (RC and CM). Personal property or obstructions to access will be removed per the WA. Personal property will be hauled to a secure place, or hauled to disposal or recycling centers, as noted.
9. Soil excavation (RC and CM). Soil will be excavated to a depth of at least 3 inches in all areas identified for remediation per technical specifications. Excavated soil will be placed in a truck for hauling to the specified disposal area. Dust suppression, property protection, and other activities associated with soil removal will be conducted as described in technical specifications.
10. Conduct post-remediation sampling per the CQA sampling plan (CQAM). Sampling and analysis will be conducted per the FSP to identify remaining hotspots with a minimum area of 500 square feet (5% of the property) using statistical analysis. Collect soil samples and analyze by XRF.
11. Determine whether the property excavation is complete (CQAM), per the FSP. Upon determination by the CQAM that property soil removal is complete, proceed to the restoration phase for the property.

Restoration Activities

12. Replace soil (RC and CM). Haul and place borrow material on property per technical specifications, and per the WA for that property.
13. Replace or relocate personal property (RC and CM). Haul and replace personal property from secure storage and replace fences, as necessary.
14. Restore the property (RC and CM). Per the technical specifications and the WA, lay sod, sow grass seed or place gravel; replace any trees, shrubs, or other items as necessary.

Post-Remediation Activities

15. Conduct post-remediation survey (CQAM, Chino and PR). Photograph the property in its restored condition. Include all structures, personal property, vegetation, and other items that were removed and replaced. Walk the property to observe the final conditions, and ensure that the property is restored to the satisfaction of the PR.

16. Obtain post-remediation sign-off (Chino and PR). Obtain written concurrence that post-remediation conditions are satisfactory, and document any comments or questions from the PR.
17. Maintenance of the restored property, as applicable (RC), per the conditions of the WA (e.g., water new seed on a daily basis, until germination).

4.0 SCHEDULE

The IRA will commence upon approval by NMED of this Work Plan.

The IRA will likely be ongoing for at least 6 months. Some breaks may be necessary in winter as conditions require, or to await optimal seeding and sod-laying conditions.

The FS will be developed concurrent with the IRA. Any potentials useful approaches identified during the evaluation of remedial alternatives may be incorporated into the IRA as appropriate. Subsequent phases of remediation will follow the IRA, and will be performed per the recommendations in the FS, or NMED's development of a Record of Decision.

5.0 REFERENCES

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- Gradient 2003. Addendum to the Risk Assessment for Hurley Soils Investigation Unit: Basis for a Remedial Action Criterion for Copper in Soil. Prepared for the State of New Mexico Environment Department by Gradient Corporation, Cambridge, MA, December '19, 2003.

FIGURE

